

REMARKS

The Office Action of August 1, 2003 has been received and carefully reviewed. It is submitted that, by this Communication, all bases of rejection and objection are traversed and overcome. Upon entry of this Amendment, claims 1-6 remain in the application. Reconsideration of the claims as amended is respectfully requested. New claims 7-19 have been added in order to set forth additional specific embodiments of Applicants' invention.

Claims 1-6 stand rejected under 35 U.S.C. 102(b) as being anticipated by Antos US 4, 341, 664.

Specifically referring to claims 1 and 6, the Examiner points out that Antos discloses a composite comprising silver acetate, chlorate, perchlorate, fluoride, nitrate or the like on a support having a pore diameter of 20-300 Angstroms and a surface area of 100-150 square meters per gram. Referring to claims 2 and 4, the Examiner states that Antos discloses silver nitrate and silica. The Examiner states that claims 3 and 5 are anticipated because Antos discloses zeolitic aluminosilicates.

Claims 1 and 6 have been revised to recite that the silver compound and/or copper salt are adapted to preferentially releasably retain gaseous alkenes from a gaseous mixture comprising said alkenes.

The Examiner is directed to the Applicants' specification at page 6, line 30 to page 7, line 1, "[t]he adsorbent comprises a metal compound, preferably a silver or copper compound supported on a carrier." Applicants respectfully point out that in Antos, silver is a minor component (0.01 – 1%) and is preferred to be in its metallic state. Further, Antos teaches that silver is "a second essential constituent of the multimetallic catalyst...."

In sharp contrast, the present invention recites that silver is a "preferred metal" and that silver nitrate is a "preferred salt," however, the present invention does not require the use of a silver compound, for example, copper may be used. Claim 6 does not recite silver or any compound thereof.

Antos discloses a catalytic reaction at 975°F and 10 psig for the dehydrogenation of isobutane into isobutylene (see Example 1).

Applicants submit that such a high temperature catalyst, as disclosed by Antos, could not be used as a sorbent for low temperature separation of alkenes from alkanes. Applicants further submit that because the Antos catalyst is effective, the disclosure actually teaches away from using the catalyst as a sorbent for the preferential releasable retainment of gaseous alkenes from a gaseous mixture including the alkenes, because it will adsorb other compounds in the mixture, for example alkanes, in order to react.

Still further, Applicants respectfully submit that while silica, zeolitic aluminosilicates, silver acetate, chlorate, perchlorate, fluoride, nitrate or the like, are disclosed in Antos, they are taught to be used in a method for "dehydrogenating a dehydrogenatable hydrocarbon to produce a hydrocarbon product containing the same number of carbon atoms but fewer hydrogen atoms."

In contrast, Applicants submit that the present invention recites adsorbents having compounds and/or salts which are adapted to preferentially releasably retain gaseous alkenes from a gaseous mixture comprising said alkenes. The Examiner is directed to Antos' disclosure at column 5, lines 39 – 50:

... it is intended to include within the scope of the present invention, the dehydrogenation of any organic compound capable of being dehydrogenated to produce products containing the same number of carbon atoms but fewer hydrogen atoms ... More particularly, suitable dehydrogenatable hydrocarbons are: aliphatic hydrocarbons containing 2 to 30 carbons atoms per molecule, alkylaromatic hydrocarbons where the alkyl group contains 2 to 6 carbon atoms, and naphthenes or alkyl-substituted naphthenes.

In sharp contrast, the Applicants' specification recites the preferential adsorption of gaseous alkenes from gaseous mixtures containing such alkenes. The Examiner is directed to Applicants' specification at page 2, lines 13-24:

The invention provides new adsorbents for use in separating selected gaseous hydrocarbons from a mixture comprising the hydrocarbons. The invention provides new methods for accomplishing such separation using the novel adsorbents. The new adsorbents are very effective for selective adsorption of alkenes such as ethylene, propylene, and mixtures of these from a gaseous mixture which comprises the alkene. In one embodiment, the invention provides an adsorbent for preferential adsorption which comprises a metal compound supported on a carrier. The metal compound is characterized by the ability to releasably retain the alkene whereby the alkene is preferentially adsorbed from the mixture. This produces a non-

adsorbed component and an alkene-rich adsorbed component. Next, by changing at least one of pressure and temperature, the alkene-rich component is thereby released from the adsorbent.

Applicants respectfully submit that while Antos discloses similar materials, Antos neither teaches nor discloses materials adapted to preferentially releasably retain gaseous alkenes from a gaseous mixture comprising said alkenes as recited by the Applicants. Antos specifically states that, "irrespective of how the dehydrogenated hydrocarbons are separated from the unreacted hydrocarbons, a stream containing the unreacted dehydrogenatable hydrocarbons will typically be recovered from this hydrocarbon separation step and recycled to the dehydrogenation step." Applicants submit that Antos is not teaching an adsorbent for separating, for example alkenes from alkanes, but rather is teaching an attenuated superactive multimetallic catalytic composite for use in hydrocarbon dehydrogenation. As such, Applicants submit that Antos does not anticipate or render obvious Applicants' invention as defined in claims 1 and 6 and those claims depending therefrom.

For all the reasons stated above, it is submitted that Applicants' invention as defined in claims 1-6 is not anticipated, taught or rendered obvious by the cited references, either alone or in combination, and patentably defines over the art of record.

Claims 1-6 also stand rejected under 35 U.S.C. 102(e) as being anticipated by Lampert et al. US 6,074,973.

Specifically referring to claims 1 and 6, the Examiner states that Lampert discloses a hydrocarbon trap comprising a silver compound and a palladium compound on a support, wherein the silver compound is silver nitrate, the support has a 90-150 square meters per gram, and comprising pores with a diameter of 4-8 Angstroms. Regarding claims 2 and 4, the Examiner points out that Lampert discloses silver nitrate on silica. In the rejection of claims 3 and 5, the Examiner states that Lampert discloses ZSM-5.

Applicants respectfully submit that Lampert teaches the trapping of *all* hydrocarbons during cold operation periods and then releasing all of the hydrocarbons for oxidation during higher temperature periods.

Following the teaching of Lampert, Applicants submit that one would not use the sorbent disclosed by Lampert to preferentially releasably retain gaseous alkenes from a gaseous mixture comprising said alkenes from other hydrocarbons in the mixture, for example the separation of alkenes from alkanes. As such, Applicants respectfully submit that Lampert teaches away from the Applicants' invention.

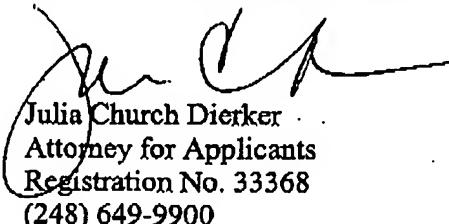
As such, it is submitted that Applicants' invention as defined in claims 1-6 is not anticipated, taught or rendered obvious by the cited references, either alone or in combination, and patentably defines over the art of record.

In summary, claims 1-6 remain in the application. New claims 7-19 have been added in order to set forth additional specific embodiments of Applicants' invention. It is submitted that, through this amendment, Applicants' invention as set forth in these claims is now in a condition suitable for allowance.

Further and favorable consideration is requested. If the Examiner believes it would expedite prosecution of the above-identified application, he is cordially invited to contact Applicants' Attorney at the below-listed telephone number.

Respectfully submitted,

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